From Protest to Sanitation

Critical Reflections on the UN's Discourse of Environmentally friendly Technologies

Muchie, Mammo

Publication date:
2000

Document Version
Publisher's PDF, also known as Version of record

DEPARTMENT OF DEVELOPMENT AND PLANNING AALBORG UNIVERSITY

From Protest to Sanitation: Critical Reflections on the UN´s Discourse of Environmentally friendly Technologies

Mammo Muchie

DEVELOPMENT RESEARCH SERIES
RESEARCH CENTER ON DEVELOPMENT AND INTERNATIONAL RELATIONS (DIR)

WORKING PAPER NO. 81

Research Center on Development and International Relations (DIR)
Aalborg University
Denmark
Development Research Series
Working Paper No. 81

ISSN 0904-8154

Published by
DIR & Department of Development and Planning
Aalborg University

Distribution
Department of Development and Planning
Secretariat, room 36
Fibigerstraede 11
DK-9220 Aalborg East
Phone + 45 96 35 84 19
Fax + 45 98 15 65 41

Lay-out and wordprocessing
He He and Marianne Hoegsbro

Print
Uniprint and Centertrykkeriet, 2000

The Secretariat
Research Center on Development and International Relations
att: Secretary Marianne Hoegsbro
Fibigerstraede 2
Aalborg University
DK-9220 Aalborg East
Denmark

Tel. + 45 96 35 98 10
Fax. + 45 98 15 32 98

E-mail: hoegsbro@i4.auc.dk or jds@i4.auc.dk
Homepage: www.i4.auc.dk/development

From Protest to Sanitation: Critical Reflections on the UN´s Discourse of Environmentally friendly Technologies

Mammo Muchie[1]

Abstract
Environmentally sound technologies (ESTs) have been recommended for uptake into production mainly from discussions within the United Nations, professional "green" organisations, and industry. The UN has taken the lead both in conceptualising these technologies and organising institutional mechanisms for their transfer. This article engages critically the UN's conception of ESTs and the mechanisms for diffusing them into national industries. A closer look UNEP/UNIDO mechanisms for diffusing cleaner production practices and transfers into national industries has also been made to see if new avenues have been opened to connect environment with development at the industrial level. It appears that the so-called "cleaner" technology risks are no more than an old wine in new bottles.

Background: The Earth Summit, Agenda 21, and the problems of EST transfer

The United Nations Earth Summit, held in Rio de Janeiro in 1992, produced an action document called Agenda 21. The purpose of Agenda 21 was the unenviable task of translating into an action document the United Nations Commission on the Environment and Development (UNCED) *Report on Sustainable Development*. Underpinning Agenda 21 is the explicitly stated claim that gains for environmental security can be purchased even while embarking on economic development. Its ruling assumption is that there is no zero-sum game between environment and development; that a positive-sum game between them is both desirable and possible.

While politically such a rhetorical discourse may be necessary and perhaps even effective in balancing conflicting interests and bringing along many to support environmentally friendly measures, in reality economic development (as it has been practised) entails and generates an unacceptable threshold or level of waste

[1] Mammo Muchie has been appointed as a visiting research professor at Aalborg University from September 1999. He has been working in various universities in the UK and Europe, and worked recently on a part-time basis at Cambridge University. He has been working on a full-time basis at Middlesex University. His current research is on a DFID funded project on industrial and environmental technology policy in Africa.

and polluting emissions. Analytically, the claim that environment and development can be paired has to be tempered with the scepticism that it not be possible. Admittedly, it is possible to produce an empirical case where a particular economic action is not unduly detrimental to environmental matters. It is equally possible to generate the opposite empirical case. This suggests that a document that is largely politically negotiated and presented as a policy path-setter still needs to be scientifically validated into action. The work remains at the initial stages, and there is not yet conclusive empirical proof that a trajectory that combines economic development with environmental concerns can override the pre-1992 Earth Summit patterns of industrial-economic evolution.

While relationships between the environment and development remain controversial, the reality is that most significant stakeholders act as if, by the application of political will and scientific and technological ingenuity and innovation, any residual tension that exists between them can be diffused and harmonised. I assume that development can be channelled along trajectories that will not impose much burden on the environment, given a shared belief and concerted action among all the significant actors and stakeholders involved. In other words, theoretically, there is a positive-sum game between them. In fact, some have suggested that industry, technology, and economic development can be re-directed to serve as the "engine" for the protection of the environment.

Agenda 21 was thus born as the task plan to facilitate implementation of the new combination of environment and development. It emerged after the Earth Summit set forth a policy orientation for governments, businesses, civil society stakeholders, and learning institutions to work in concert to "tame" or "discipline" economic growth from imposing further burdens on the environment. Thus a global policy concern not to evade responsibility for the environment came out of the global discourse of the United Nations Conference on the Environment and Development (UNCED), and it is enshrined in the principle of "common and differentiated responsibility" for the environment.

Agenda 21 has translated "common and differentiated responsibility" relative to the transfer and access of environmentally sound technologies (ESTs) to mean the following:

- facilitating access to state-of-the-art technology, especially to developing countries;
- promoting, facilitating, and financing access to and transfer of ESTs and know-how to developing countries "on favourable terms, including on concessional and preferential terms;"

- promoting technology co-operation between suppliers of technology and recipients;
- facilitating the maintenance and promotion of environmentally sound indigenous technologies that may have been neglected or displaced;
- supporting endogenous capacity-building for assessing, adopting, managing and applying ESTs by training human resources, strengthening institutions to enhance capacities for R&D, and integrating sector assessments of technology needs; and
- promoting long-term technological partnerships between holders of ESTs and potential users [1].

There was a clear recognition that coupling environment with development would entail that new technologies which are environmentally sensitive should be made available on "favourable terms" to those who seek it from those who have it. Chapter 34 of Agenda 21 identified both public and private technology proprietors as sources for developing countries to shop for access to ESTs. It may be easier just to access technology in the public domain, although information may not be readily available that would facilitate such access. Agenda 21 also stipulated that ways must be found to make it easier for developing countries to gain access through information provision and other supportive measures to make ESTs accessible which may be already protected by patent and intellectual property rights [2].

The international dialogue on ESTs suggests that as a matter of responsibility and commitment to the environment, technology proprietors from countries with strong systems of innovation be enjoined to transfer ETSs on "favourable terms" to developing countries with relatively weak systems of innovation. While positive encouragement of such transfers is given at international forums and in international documents, some firms and industries (both suppliers and recipients) may not be aware of their "environmental responsibilities." Even if they have some awareness of the international process, they may not know how to translate such provisions into direct, specific and measurable activities. Thus, it is necessary to provide information about implementation. The United Nations Environmental Program (UNEP) and the United Nations Industrial Development Organisation (UNIDO) support cleaner technology transfer and production practices through a mechanism known as the National Cleaner Production Centres (NCPCs). The main function of the NCPCs appears to be providing information on ESTs and their transfer and the possible provision of financing to facilitate the promises enunciated in Agenda 21.

Agenda 21' s concept of environmentally sensitive technologies

The definition of ESTs has been controversial, and the jury is still out in conceiving and settling on an agreed definition. There will probably be no conclusive definition. Part of the problem is the intrinsic ambiguity in relativistic concepts such as ESTs. Time, scale, duration of use, location, institutional, and cultural contexts of a given EST influence its degree of sensitivity to the environment. For example, Agenda 21 defines ESTs in three ways:

- as discrete products and processes,
- as technology systems,
- as technological paradigms or revolutions [3].

If ESTs are defined as **discrete** entities, they appear to be process and product technologies that generate little or no waste, including end-of-pipe technologies for the treatment of pollution.

If ESTs are defined as **technological systems**, they are seen as "total systems which include know-how, procedures, goods and services and equipment as well as organisational and management procedures."

If ESTs are defined as **new technological paradigms or revolutions**, they are burdened with the responsibility to protect "the environment." In this sense, ESTs are meant to be "less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes" [4].

In the third definition, ESTs are said "to attain sustainable development, sustain the world economy, protect the environment, alleviate poverty and human suffering" [5]. Such broad definitions essentially turn ESTs into a sort of metaphor for encouraging attitudes to imagine and create a "new sustainable world," suggesting a radically new trajectory and policy outlook for creating future wealth which would not be attained at the expense of ecological well-being and human health.

What, then, are ESTs, given that Agenda 21 seems to use them as a practical tool for modifying products and processes as well as a metaphor for envisioning an alternative industrial paradigm? Is it desirable and necessary to arrive at a settled definition? Is there something inherently problematic in applying a concept of "environmental sensitivity or soundness" to any technology, product, process, and material which in time turns into environmental "non-sensitivity" in the form of rust and dust?

An extreme view emerged in a workshop, run by UNCTAD, which expressed doubt whether a precise definition of ESTs was both possible and helpful: "EST is a useful label in political discussion and a barrier to the practical formulation of effective action.... The desire to avoid the notion of a ' technological fix' could imply that a precise definition is both unlikely and unhelpful"[6]. Thus, UNCTAD prefers to use ESTs as a metaphor for changing the behaviour of institutions, activities, and actors rather than a means of formulating practical and effective actions that change products and processes. In the UNCTAD sense, ESTs signal an epistemological reorientation, an alternative paradigm to industrial and technology organisation, evolution, decision making, policy. outlook, strategies, and research and development. The real dilemma is that in the latter sense, ESTs become more intentions than practical means for implementing environmentally sensitive production. Is there a way in which the general intention can be realised through specific action? In the discrete sense, can the ESTs become readily aligned with their definition as new "technological systems" and new "technological revolutions and paradigms"? This is a difficult question to answer at a meta-level. Discrete changes may be limited and isolated. Even systemic changes may be bounded with potential impacts of local scope and scale. Revolutionary technological changes are supposed to bring all-pervasive transformation within the global economy. It can be conjectured that a series of discrete changes may lead to systemic changes, and a series of systemic changes, if sustained, may lead incrementally to qualitative transformations into technological revolutions. This linear progress is likely in theory, but it does not bring closure to the open-ended definition of ESTs.

Thus the disputes and variations in definition suggest there are sticky and unsettling issues regarding the use of ESTs to bring about the practical transformation of industry and production. The goal is to produce products without diminishing their high quality, at the same time ensuring that their production (from the extraction of raw material (cradle) to disposal (grave)) does not damage human health and the natural environment at any stage of their respective life cycles. If that is the goal, is it not something that every industrialist and industrialised country must strive for as a matter of common sense and good practice?

What does the hype about cleaner production and ESTs add? This is a legitimate question since ESTs became popular as industry and business became involved in the debates on environmental matters. New actors generate both new activities and embellish old activities with new styles. In the process they introduce or bring their own cognitive map, rhetoric, language and visions. Very often they strive to retain their own overriding purpose by inserting the new

problem in a way that is consistent with their primary function and interests. Cognitive preferences for the desirable term "cleaner" can be as much a function of easing the painful entry of a government, the UN, a business, or an industry into an unfamiliar environmental territory as it may be an expression of their commitment to sustainable development. There is thus a necessary cognitive shift which comes with any inclusion and mixing of the professional ethos and overriding goals of the governmental, industrial, and business world with an environmental concern which hitherto was monopolised almost entirely by an environmental movement with a radically different agenda, often with its own hostile rhetoric toward government and business.

There is also the issue of mixing or adding a new institutional field to an existing one. The environmental movement grew out of civil society as a protest movement. Governmental patterns of behaviour are mainly influenced by the techno-bureaucratic ordering or steering principle. Business and industry come from a techno-economic institutional field or society. The differences between the techno-bureaucratic ethos of government and the techno-industrialism of business on the one hand, and the environmental protest movement on the other, is highlighted in the ringing indictment of chemical corporations by Rachel Carson, who was one of the leading motivators of the environmental movement. In her seminal work, *The Silent Spring*, Carson rang the anti-corporate and anti-technology alarm bell:

From the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death. In the less than two decades of their use, synthetic pesticides have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere. They have been recovered from most of the major river systems and even from streams of groundwater flowing unseen through the earth. Residues of these chemicals linger in soil to which they may have been applied a dozen years before. They have entered and lodged in the bodies of fish, birds, reptiles, and domestic and wild animals. Experiments find it almost impossible to locate subjects free from such contamination.... For these chemicals are now stored in the vast majority of human beings, regardless of age. They occur in mother' s milk, and probably in the tissue of the unborn child. [7]

Concern for the environment and hostility toward business and industry in general, espoused by ideologists of the protest movement, was anything but total. In fact, most of the environmental activists of the 1960s perceived large-scale industrial development as the main culprit, specifically technological development, and an "anti-technology" attitude developed among environmental

activists. The work of E.F. Schumacher in the 1970s, which promoted "appropriate technology," provided activists with alternative viewpoints of technological development. Are ESTs alternative technologies? Or are they a scrim behind which protesting environmental activists are induced to become allies with the players in the techno-bureaucratic government and techno-industrial business world? ESTs seem to serve as a compromise rhetorical device for opening a civil dialogue between the environmental champions who were looking for alternative technologies and the techno-industrial business and techno-bureaucratic government advocates of the cleaner production and technologies of the 1980s and 1990s. Agenda 21' s recommendation seems to set up NCPCs with the apparent objective of diluting anti- technology protests. from environmental social movements while facilitating the entry and opportunity of the business world to combine profit-making with environmental benefits.

However, the ESTs advocated by environmental movements are not the same as those advocated by the UN agencies. Unsettling questions remain:

- How much do ESTs emerging from the recommendations of Agenda 21 represent the kind of alternatives desired by the environmental movement?
- Do they reflect a shift in discourse as a result of new actors such as governments, the UN, corporations, and their networks into the environmental arena?
- Do ESTs reflect the professionalisation of the environmental movement or its deflection into an institutional field where it no longer has as much autonomy as the new actors?
- Do ESTs mark the end of protest and the start of a pragmatic tinkering to find technologically and organisationally practical solutions to pollution-causing industrial problems?

There are no clear-cut answers to these issues. But while they are difficult to resolve, they can provide clues as to why the definition of ESTs has become such a hard nut to crack.

One of the most interesting angles in the dispute over definitions of ESTs has come from industrial engineers. They prefer to state a hierarchy of principles regarding ESTs rather than provide a strong definition. Then they take the discrete version from Agenda 21 and UNEP and construct a list of actions that should result in increased environmental sensitivity to technology. The principles are: (a) prevention is better than reuse, (b) reuse is better than recycling, and (c) recycling is better than disposal [8]. This is interesting in that

it ranks degree of sensitivity according to a certain normative assumption and qualitative measure, and correlates a spectrum of high and low environmental sensitivity to technology that is spread between the actions of prevention and disposal, respectively.

While the hierarchical normative approach and formulation of cleaner production solutions offer a guideline for action, they carry the relativity of the definition of ESTs even more. Far from discouraging the search for definition, they in fact stimulate it. This is because the answer to the problem of what it means to say that "Businesses are environmentally friendly" remains conceptually open-ended. The problem is also related to a more substantive query: Do the available definitions facilitate or hinder the necessary moves to institute alternative production systems by converting existing production systems to cleaner production systems? There is also the problem of whether those at the implementation end of the spectrum know precisely what cleaner production is or what the introduction of ESTs into their production system means to them and others in the community. In addition, there are the issues of how to manage the painful consequences of the transition of workers and communities affected by the change of production regime, if indeed such transition is as substantial as required to fulfil environmental obligations and constraints.

Far from being academic, the dispute over definition reveals the difficulties international and local participants will confront in translating and putting into practice the value-laden and contentious concepts which are ESTs. Thus the issue of lack of closure in defining ESTs makes comparison and best environmental practice relative. Its merit lies in changing the anti-technology discourse of the protest movements of the 1960s and 1970s into the pro-technology, techno-industrial discourse of the 1980s and 1990s. While ESTs have achieved such rhetorical shifts, it remains to be demonstrated how far they have become real alternative technologies that resolve environmental constraints within the dominant logic of economic development.

In spite of the problems related above, some progress has been achieved in incorporating EST concepts into Agenda 21's discrete version of process and product sensitivity to environmental matters and values in production. ESTs have thus been reduced to a preventive rather than react-and-treat environmental strategy involving processes and products. In this sense, ESTs can be described as cleaner production. UNEP has defined cleaner production as the "continuous application of an integrated preventive environmental strategy to processes and products so as to reduce risks to humans and the environment." The reduction of ESTs as discrete processes and products circumvented the definitional

ambiguities without resolving them. UNEP seemed to create something like a definitional precautionary principle which implied that lack of definitional certainty is no excuse for not anticipating and preventing, with foresight and forward planning, better production action at the process and product level. Such preventive environmental intervention is thought to be preferable to waiting and then after the event engage in "react and treat" pollution control.

Thus UNEP and UNIDO are not dealing with ESTs as systems and paradigms but as cleaner production activities in the form of products and processes. It is from the discrete change of product and process that perhaps they believed more substantial systemic, economy-wide changes might take place. This use of ESTs. to achieve cleaner production makes it easier to compute the reduction of pollution load in processes and products, the conservation of materials and energy, the elimination of toxic raw materials, the reduction of the quantity of toxicity in all emissions and wastes before they leave a process -- in short, the reduction of polluting impacts along the lifecycle from raw material, from extraction to disposal. It helps measure and calculate levels of pollution reduction that depend on intervention to achieve early prevention. Having undertaken a number of pollution prevention measures in products and processes, UNEP claims that cleaner production puts a heavy premium on change of attitude more than on the practices of "waste minimisation and pollution prevention" [9]. Over 50% of waste can be avoided by **simple management measures** and **minor process changes** (emphasis original). Over 65% of the barriers to cleaner production involve **human motivation** and **attitudes** (emphasis original) [10].

In empirical production practice, UNEP/UNIDO have encouraged the following specific activities:

- product re-design: replacing an existing product with one using a less toxic or ecologically destructive production method;
- input substitution: using recycled waste rather than fresh material input;
- process redesign: e.g., introducing closed loop systems to prevent waste;
- offering incentives to managers, workers, and engineers to collaborate in the development and use of safe substitute materials and processes;
- using the so-called "factor-four" formula which provides an equivalent product or service while using one-fourth of the energy and materials and generating one-fourth the waste;

- good housekeeping, requiring operational procedure modifications that tighten and plug waste generating operational practices; and
- taking measures related to social dislocation due to the introduction of cleaner production.

The last activity is important because the change from dirty to cleaner production systems involves not merely technical change but also social change. Introducing new technologies and training is costly to industry. It is also costly when polluting production practices affect workers, the community, and consumers of products, and even future generations, depending on the nature of the toxicity of the chemicals used or depending on the degree of pollution-intensity of the particular sector in question. If not managed properly, change can cost all of them, although admittedly in different ways. Thus the change from technology to cleaner technology, from environmentally insensitive technology to ESTs, and from dirty production practices to cleaner production practices, involves technical and social relationships. Both the cost of change and the relativism of the concept of ESTs introduce barriers which cannot be ignored for their wider diffusion.

On the negative side, the cost of change may invite demands for compensation by those affected. On the plus side, adoption of cleaner production practices can reduce raw material and energy costs on the input side and pollution control and waste treatment costs on the output side. This has to be balanced with the cost of initial investment for installation of the cleaner production system. Additional benefits are related to improvement in employee health and safety, company image, and compliance with national and international environmental regulations. In the short term the installation cost may be high, but in the course of time the gains may outweigh the initial costs.

Recall that UNEP and UNIDO established National Cleaner Production Centres (NCPCs) for the purpose of providing information about EST transfer and financing to facilitate Agenda 21. The relevant question that emerges after establishing NCPCs is whether the task of changing the world' s socio-economic system in a techno-ecological manner can be accomplished through such formal national centres. Formal organisations represent entities with an explicit purpose. In this case the purpose is to create cleaner products and processes by selecting inputs and controlling processes and products to minimise pollutants. Can the NCPCs serve as the institutional mechanism for radically altering and anchoring national economies on an environmentally sensitive pedigree? Can they fulfil the function of changing common habits, established routines, and practices in industry? Or do they merely function as limited adjuncts facilitating production assessments and taking stock of environmental audits? The answer to

these queries may come if we scrutinise UNEP/UNIDO sponsorship of NCPCs as a means of transforming industry environmentally in a national economic system.

The UN' s mechanisms for cleaner process and product diffusion: The case of NCPCs

The NCPCs consist of a donor-sponsored local unit, a donor-based counterpart, and a UNEP-UNIDO intermediary. UNIDO became the overall executing agency responsible for training, sectoral programmes, information support, and promotion of cleaner production (CP) activities at both the national and. international levels. UNEP was also involved in the same activities, its task being to draw up training programs whereas UNIDO was supposed to review UNEP' s work in implementing training by soliciting proposals from training units, participating in a sectoral programme in each of the selected NCPCs, and organising study tours. UNEP' s staff were to participate in one of the sectoral programmes. Both UNIDO and UNEP were expected to make their information databases available to provide expertise for CP-related seminars and workshops. They were to review consulting candidates who had CP expertise and training in CP techniques, provide on-site review of NCPCs, appraise personnel performance at national CP sites, and see that obligatory attendance at meetings for exchange of ideas had been met. UNEP was to issue a bi-annual newsletter with information about the NCPCs.

For their part, the local units were to provide industry contacts and in-kind contributions such as premises, administrative assistants, and office materials. Ten advisory representatives from the helix -- academia, industry and government, one-third from each -- were to provide strategic guidance in the preparation of work and business plans for the NCPCs. They were to oversee programme achievements and failures, financial expenditure, and communication of policy with government and industry.

The counterpart body is to undertake the following: (a) provide comments on the draft training package to UNEP; (b) provide information on publicity, information management systems, guidance on how to introduce an information management system; and (c) provide guidance for demonstration and training by establishing criteria for selecting areas for demonstration and in-plant training. The work is like a consultancy except the counterpart approach hopes to be a paired relationship. That, of course, depends on the extent to which the collaboration proves to be both smooth and durable.

The expected results from NCPC efforts should be the following:

- demonstration of the feasibility and benefits of CP techniques and technologies;
- creation of human resources with CP skills;
- networking institutions that are capable of promoting the CP idea and practice;
- identifying experts who are capable of initiating CP projects in governments, industries, academia and environmental government organisations and non-governmental organisations/agencies;
- spread awareness to decisionmakers that they should support policies that integrate ESTs into operations that minimise pollution;
- induce financial services to make a CP test and pass criteria for loan applications by understanding that CPs are both environmentally and economically beneficial to industrial firms;
- improve access to CP databases and information from the north, south and transitional economies;
- help small and medium-size enterprises (SMEs);
- encourage research institutes to find low-cost, appropriate clean technologies and remove barriers to their implementation;
- encourage waste reduction audits through the regulatory framework and changing management attitudes;
- issue pollutant discharge permits in order to encourage preventive measures;
- encourage national environmental authorities to assign priority to CP in the available national cluster of pollution reduction methods.

Evaluating NCPC activities

In 1996, the first UNIDO-commissioned evaluative report of the NCPCs' initiative was done by the International Institute for Industrial Environmental Economics at Lund University. While the report recognised the importance of NCPCs, it cautioned that they are "heavily dependent on the persons involved and inter-personal relations." It suggested that the programme should be "needs-" and "demand-" driven and should be "managed with minimum administration." After identifying the weaknesses of the programme, the authors offered a number of recommendations about how to improve future funding, administer the programme, and build NCPC activities [11].

What was the outcome of the evaluation of the NCPCs? Industries engaged in audits by the NCPCs are supposed to save money, improve productivity, and reduce pollution. While showing this triple gain in money, productivity, and pollution prevention requires firm-level analysis, the initial evaluation finds that much of the NCPCs' efforts were confined to demonstration projects,

workshops, and preparing procedures and protocols for the cleaner production assessment (see Table 1).

As Table 1 shows, there are policy variations among countries with NCPCs, ranging from having a policy, to having no policy, to a willingness to develop one in some instances. Variations in the quantity, type and host institution are also observable. In some instances countries like the Czech Republic and Tanzania had prior experience before being selected to join the UNEP/UNIDO NCPC initiative. The numbers trained, the number of workshops, and demonstration projects also vary from country to country.

It is also difficult to estimate the nature of the training or the quality of the workshops and demonstrations. Zimbabwe-CPC commissioned a consultant to evaluate its demonstration projects in different companies. "One of the companies was of the opinion that the exercise was a waste of time since it has always had links with South Africa and nothing was new" [12]. This is one of the few direct feedbacks from a company manager. Much more independent feedback is needed to estimate the actual benefit the NCPC brings after implementation. Most people recognise its importance as a concept and its relevance to creating environmentally sound goods and services.

A second evaluation, done in July, 1998 on behalf of the Swiss Federal Office of Foreign Economic Affairs (FOFEA), made a comparative analysis of cleaner production centres that are supported by USAID' s Environmental Pollution Prevention Project (EP3), the World Environmental Council (WEC), UNIDO/UNEP, and the Danish Commission on Environment and Development (DANCED) [13]. It was based on interviews of various stakeholders involved in the cleaner production efforts: 22 centres, the donors, and the counterpart organisations [14].

Issues included the institutional set-up, clients, services offered, finance, and general experiences and recommendations. Most of the centres reported that affiliation with governments, universities, and counterparts did not work very well. Managers often did not include the CP programme in their business considerations. They thought in terms of reducing staff, cutting costs, process rationalisation, and so on. "That is why CP, even if profitable, is not interesting enough for managers" [15]. The respondents indicated that information about CP was not a problem, but they said the ability to select, value, apply, interpret, screen, and use was lacking. They reported that it was costly to update and maintain a good system which may not be used as often as possible.

Training needs to be continuous, depending on the entry of new CP suppliers into the market. Criticism of the training offered by the NCPCs was severe. Respondents reported that after a three to five day training, there was an expectation that CP experts would result. They said it was inevitable that "send[ing] them out as experts was a complete failure." They also said those trained at the centres have emerged a "under-trained non-experts" [16]. They questioned the value of replacing local experts with international experts. They said that foreign experts should not "perform directly technical assistance as this is a one-off show, costly and non-sustainable" [17]. The respondents also perceived UNIDO/UNEP involvement as negative because clients thought the centres were UN projects and thus ought to provide "free" services. Overall. evaluations of the interviews indicate that the NCPCs face intractable problems from largely unreconstructed management attitudes toward implementing CP programmes.

Problems of NCPCs as an institutional mechanism to transfer ESTs to industry

Institutional arrangements aimed at changing the industrial-economic structure of a national economy require the engagement of participants such as firms, organisations, governments, donor, and so on, in the system. These players need to interact with each other to bring about a different industrial and technological trajectory than the established pattern, one that leads to improvement of the industrial performance and innovation of national economies. The question is: Are the NCPCs simply organisations set up for a single explicit purpose or institutions that establish and contribute to an environmentally sustainable industrial-economic structure? If the former, they become no more than a set of organisations with their own vested interests. If the latter, they become agencies and institutions that can establish new rules of the industrial-economic game with environmentally sensitive practices, habits, routines, and standards of behaviour. A related issue is whether or not their structure and activities can lead to the institutional strengthening of environmentally sensitive industrial participants and agencies. When we take these two criteria and try to match the concept of NCPCs, with their industrial structure, their location, and activities, we are left with more doubts than certainties regarding their role and contribution.

To date, the work of the NCPCs has involved the training of staff, running of workshops and demonstration projects, and providing CP options. Implementation is left to the firms. NCPCs have no legal enforcement and compliance monitoring backup. The question is whether these tasks require a separate body to carry them out or are they best left to the firms, industries, research systems, and national regulatory agencies.

Nearly all NCPCs are donor-driven except for the Brazilian NCPC. Donors have not learned to provide assistance that is unencumbered by their interests. The role that UNEP/UNIDO plays as intermediaries is similar to that of agent in a transaction between sellers and buyers. If the buyer and seller can work directly, there is an opportunity to save transaction costs. All UNIDO/UNEP seems to do is to rely on donor support to underwrite the formation of NCPCs. There is no reason why these centres cannot be directly set up on a straightforward bilateral basis if the donors wish to do so. Nothing would be lost, and such a process would simplify administrative layers and save on transaction costs. It is comparable to spending money to collect data on poverty rather than spending the resources to remove poverty directly by engaging poor people where they live.

The incentive for local participation in the poorer emerging economies seems to be the attraction of funding offered by the UNIDO/UNEP connection with donors. This encourages local participants to depend even more on external experts rather than searching and learning by finding out for themselves how to reorganise their production and industrial systems and incorporating environmental constraints. There is even a greater risk that the wrong people might bring themselves forward because they seek access to donor funds rather than attracting self-motivated participants who are interested in environmental reorganisation of production as a value in itself.

The NCPCs have undertaken various types of production audits. Some, such as the most advanced semi-industralised economies of India, China, Brazil, Mexico, and the Czech Republic, have undertaken in-plant assessments of small and medium-size industries. In India, the first CP project was applied to the industry segment known as Indian small-scale industries. The selection involved agro-residue-based pulp and paper used to produce paper for the domestic market. The technical status of the CP project was a comparatively simple technology [18]. The Chinese industry segment involved food processing that produced beverages for the domestic markets. The technical status was moderately sophisticated technology. Both India and China, as well as Mexico, Brazil, and the eastern and central European countries with CP centres, have adequate local-level engineering competencies. The interesting point is that the NCPCs in these countries can undertake their own CP assessments without the need for support from UNIDO/UNEP. Brazil did not even need counterpart donors to establish its NCPC.

If CP assessments were guided by the concept of ESTs as "preventive" rather than "curative" methodologies and techniques, there would be more moves to

establish NCPCs as part of evolving industrial and science policy in their respective national settings. It appears many of the CP assessments concentrated on finding techniques that optimise cleaner outcomes and did not include a broader concept of creating new innovations by research-led interventions. The extant NCPCs suggest they were largely founded on an ad-hoc basis, and they remain vulnerable to withdrawal of donor financing. They are not inserted in the domestic system of innovation to build capacity for self-financing, among other things. The industries selected for CP auditing may not be those identified as strategic from the viewpoint of planning a national economy' s structural industrial transformation. Far from being a factor for developing a national system of innovation, the NCPCs may even misdirect effort and resources.

Although UNEP/UNDO should be commended for taking the initiative, it is difficult to find a hard contribution that is specific to the UNIDO/UNEP component in NCPCs. If one judges by countries queuing up to ask for UNEP/UNIDO assistance, there must be something being offered that is not evident to those looking at the issue through a critical lens. It is also possible that countries are asking for UNIDO/UNEP assistance for a variety of reasons not necessarily related to the effectiveness of the initiative.

In principle, an active NCPC (e.g., Brazil, Mexico, India) can insert itself into the world flows of information and knowledge without the need to mediate its functions and validate its actions through any external third party (i.e., UNEP and UNIDO). Those countries that are poorer and less able to take the initiative to find information might need UNEP/UNIDO or a regional network to assist in the search for information. The problem appears to be that countries with a reasonable level of competence compete for UNEP/UNIDO attention against those which are far less able. If the terms for UNIDO/UNEP involvement stipulated assistance first to the poorer emerging economies, perhaps a case could be made for UNEP/UNIDO' s role to assist these countries.

The positive aspect of NCPCs is that they have produced cognitive software for conceptual sequencing of CP options. UNIDO/UNEP' s contribution here is self-evident. "Conceptual sequencing" contributes to guiding present and future firm-specific production assessments and audits. The weakness of the NCPCs is that they were not conceived to be linked to the R&D network in CP technologies in the indigenous setting of emerging and transitional economies. In the end, this lack of integration into the national system of innovation of an emerging and/or transitional economy makes the NCPC role limited and peripheral to production cum industrial development in those economies. Clean production in industry can be achieved best when the entire network of partners is involved: suppliers, clients, local governments, financial institutions, industry

sector organisations, other support organisations, R&D organisations, and service providers such as waste management companies. In the industry sector of each country the setting will be different, and different network partnerships can stimulate the implementation of CP practices. Therefore a network analysis needs to be undertaken before implementing any kind of CP programme in a given industrial system.

Toward an alternative institutional mechanism

In principle, the NCPC idea is timely and necessary if it is included as part of a strategy of industrial transformation without degrading the environment. In reality, NCPCs have been institutionally fuzzy, located outside government, industry, the university, and their networks. They are not located in but outside the loop of actors that matter. Thus, they may not emerge as an independent actor from their peripheral position in the country' s systems of domestic mobilisation of resources, innovations, and learning. They are tied organisationally to UNEP/UNIDO and the counterpart bodies more than the innovation networks and research systems in the national setting. Any benefit from their activities seems geared more to enrich the learning curve of international consultants and some domestic players than the local industries. Their status seems more like isolated NGOs rather than being an active node in systems of industries and innovations and filling a recognised national role.

The justification for their existence is related to undertaking tasks such as generating CP options and assessments, training, information, policy, and capacity building. While they have engaged in all these activities, the evaluation reports containing initial feedback show that NCPCs have serious problems implementing their tasks.

What is emerging is that the future of NCPCs is uncertain given their fuzzy positioning with regard to the agencies that are relevant to implement CP options. They appear to be an additional administrative layer rather than an integral part of a producing, innovating, and practising CP agency.

The donor-based counterpart, as an arrangement, reflects more the tied-aid arrangement of donors rather than an ability to identify local partners who can assist the habituation of a preventive approach to environmental safety as part of the domestic system of innovation. As it stands now, the paired arrangement may build more expertise and knowledge among the personnel of the international partner than the local partners' personnel. Much of the work the partners perform can be done with domestic researchers and engineers. There is no proof that domestic actors (industry, research centres and so on) are unable to fill the role presently held by the international counterparts. Nor does it seem a

search has been done that includes local centres prior to settling the selection of the counterpart. As mentioned, the basis for the selection of a counterpart seems an unchanged pattern of donor funding tie-ups. Dutch donors invariably prefer Dutch counterparts. Austrian donors prefer Austrian counterparts, and so on. Unhinging the paired arrangements from tied-aid arrangements is thus crucial to opening possibilities for the NCPCs to become effective within the national industrial setting.

The technical status of CP options seems to suggest that they are no more difficult puzzles than options requiring simple technological solutions. There is thus *prima facie* a case for asking whether the NCPCs are necessary at all. The burden of proof lies with the NCPCs to demonstrate their value to industry by promoting an environmentally aware reshaping of the overall production arrangements of firms. What have NCPCs done which an industry -- given its own initiative -- cannot do, left to itself. On balance, unless the NCPCs evolve as an integrated part of the research system for cleaner production system generation and development, they will probably expire with little push from any corner.

This is not to denigrate or render irrelevant the ideas for which they were originally established. Rather, it is to question -- given their present fuzzy circumstances -- whether they will emerge as the best instrument for implementing those ideas. After the first-phase evaluation, it is difficult to conclude that they have established beyond reasonable doubt that "they return value for money." If they are to continue, there is a need to re-think their role with a view to relocating them in such a way as to integrate their activities into a country's industrial policy, systems of innovation, and networks of environmentally sensitive work.

Appendix I
Organisation and Objectives of the NCPCs

Organisation

The joint UNIDO/UNEP authority set up eight to nine National Clean Production Centres (NCPCs) for a three-year term. The programme was designed to last for 8-10 years. Each centre is hosted by a national NGO or quasi-independent government organisation research department which has committed its resource to implement training, inform action networking, produce industry demonstration projects and policy analysis (see Table 1). The NCPCs are supposed to spearhead capacity building measures by demonstrating. to industry and government both the theoretical and practical sides of cleaner production in order to re-orient thinking, practical work, and the direction of production.

The first phase of NCPCs was set up between 1994 and 1995. NCPCs in Brazil, China, India, Czech and Slovak Republics, Mexico, Tanzania, Tunisia and Zimbabwe have been started. The next phase extended this number by setting up more NCPCs in Hungary funded by Austria, Croatia, co-funded by the Czech Republic. More have since been set up across the world: Bulgaria, Ecuador, Ethiopia, Poland, Uzbekistan, Vietnam, Thailand, Philippines, the Caribbean region, Central America, South Africa, and Slovenia. UNEP/UNIDO had set up some 20 NCPCs by 1999.

It appears that some countries like Ethiopia have used the UNEP/UNIDO support to create bi-lateral arrangements with a donor (Italy). Phase I is essentially a test case to determine the effectiveness of the venture. Phase II is supposed to build on the success and failures of the first phase, including the fund-raising needs of the Phase I experiment.

Table 1 NCPCS activities in various countries

Country	Setup Time	Host	Internal Network	External Communication	Demo Project	Advisory Board	Workshop	Trainees	Publicity	Policy
China	1.5 yrs	CRAES#	limited	OK*	50-60 audits	n/a	20	1000	CP manual 2500 training kits	n/a
Czech	off-spring NCPP**	NCPC	Steering Committee +	Slovak CPC & UNIDO	40CP case studies	-	-	120	reports, cases	Law courses in Universities
India	2.5 yrs	NPC++	limited	OK	20	yes	2	400 (100 NCPC)	not in focus	Adopted but not implemented No CP courses
Slovak	Similar to Czech	Slovak agency for the environment	Steering Committee with limited network	OK	n/a (now in process)	-	4	340	Published international Journals	No CP revolving fund planned: Courses in Universities
Tanzania	2 yrs	TIRDO@	none	OK	16	yes	2	just started	newsletters	Danish input; no policy
Zimbabwe	2 yrs	EPZ@@	limited	OK%	7	yes	5	100	2 newsletters	no

Source: A compilation by the author based on a variety of sources (not official: see notes)

NOTES FOR TABLE 1

* External communication is mainly with UNIDO/UNEP and the counterpart unit.

** Czech NCPC set up in 1992 as a direct off-spring of the Czech-Norwegian cleaner production programme

The Chinese Research academy for Environmental Sciences

China has reported that 200 people have specific knowledge in auditing techniques

+ SC: Confederation of Czech Industries, Czech Environment Management Centre (CEMC), Ministry of Environment of the Czech Republic, UNIDO, University of Chemistry and Technology Prague, University of Technology Brno, World Cleaner Production Society (set up by Norwegians taking part in projects in East and Central Europe)

++ The Indian National Productivity Council

@ Tanzania Industrial Research and Development Organisation

@@ Environmental forum of Zimbabwe

% ZNCPC complained of not so regular communication with its two counterparts.

Each NCPC is shadowed by a counterpart body from an industrialised country institution, as shown in Table 2 below. Counterpart units provide "general guidance to the NCPCs" and take responsibility for "overall training" of NCPC staff members. Counterpart arrangements enable the NCPCs to draw from the experiences and expertise of the counterpart institution while maintaining independence for local programme implementation. Thus behind every NCPC is a counterpart body recruited from the donor-giving industrial country.

Table 2 Counterparts: Country of origin, NCPCs sponsored

Counterpart	**Country**	**Funding ($)**	**NCPCs**
Stenum, Graz University, Austria	Austria	800,000	Czech & Slovak
Technical University of Denmark	Denmark		Tanzania
Danish Technological Institute	Denmark		India
IVAM Environmental Research, VuA	Holland	1,500,00	China, Zimbabwe and Tunisia
Univ. of Massachusetts at Lowell	USA		Mexico
Erasmus University	Holland		Zimbabwe
	Brazil	300,00	Brazil CPC

Source: Compiled by author from UNEP/UNIDO CPC programme document

Objectives

In general it was recommended that NCPCs provide:

- policy advice on environmental management,
- demonstrations of CP techniques and technologies,
- train industry and government professionals in CP, and
- a source of information and data on CP.

Cleaner production was targeted mainly to help small and medium-size industries, environmental management agencies, consulting companies, schools and universities, and policy-making units within governmental ministries.

Funding

Specific country donors were involved in funding NCPCs: Austria is behind the Czech and Slovak NCPCs; the Netherlands is behind the NCPCs of China, India, Mexico, Zimbabwe, and Tanzania. Brazil supports its own NCPC. Overall programme funding was contributed by UNEP/UNIDO, and fund disbursements are handled by UNIDO. Behind every emerging and transitional economy with an NCPC, there is an industrial country donor.

UNEP contributed $1,000,000 for training and subcontracting of the countries funded by the Netherlands, and UNIDO contributed $115,000 for Tunisia and $100,000 for Brazil. Mexico received in-kind funding from USAID/EP3. Obviously, this is "pump-priming" funding. Donor interest is expected to increase if the success of the Phase I programme becomes clear, and CP as an issue remains a priority. It appears the CP issue, while important, is not as engaging as it was initially thought to be in the early 1990s.

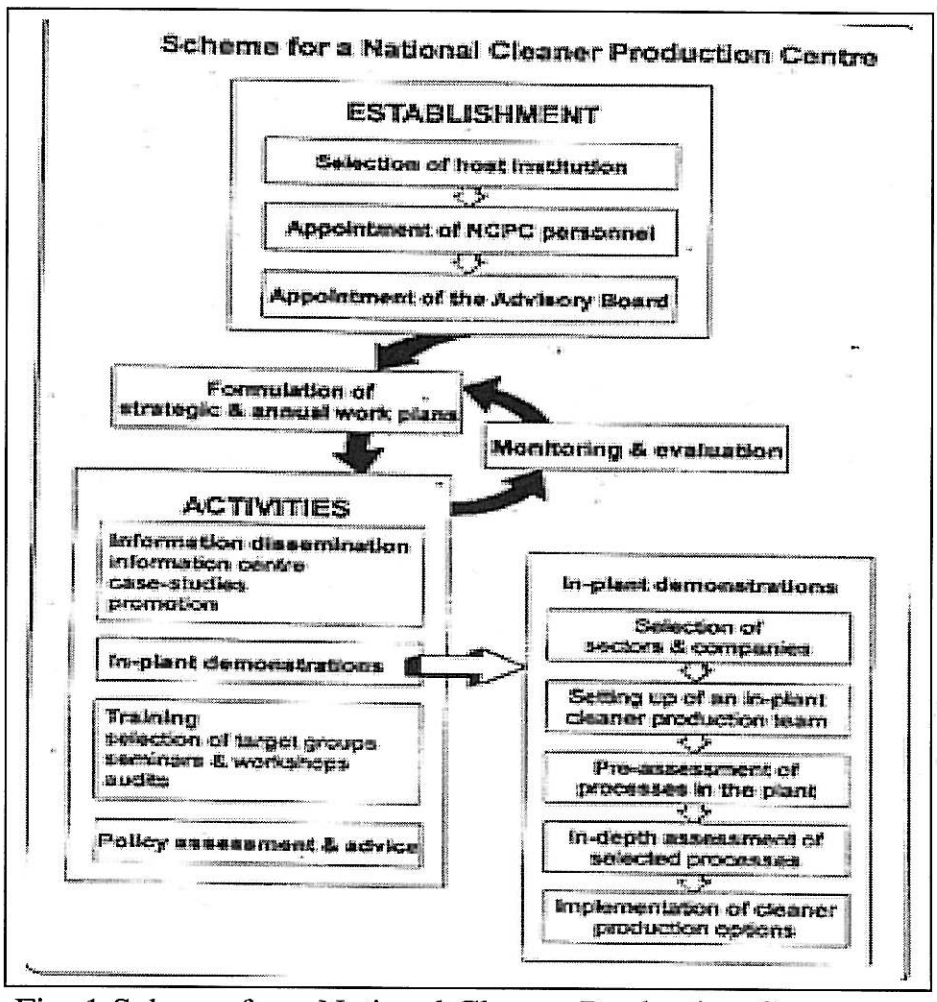

Fig. 1 Scheme for a National Cleaner Production Centre

Glossary of Acronyms

CERES = Centre for Environment and Renewable Energy Studies
CP = Cleaner Production
DANCED = Danish Commission on Environment and Development
DFID = Department for International Development, UK
ESTs = Environmentally Sound Technologies
EP3 = Environmental Pollution Prevention Project
NCPCs = National Cleaner Production Centres
NSI = National System of Innovation
SFOFEA = Swiss Federal Office of Foreign Economic Affairs
SMEs = Small and medium sized enterprises
SPRU = Science Policy Research Unit
UN = United Nations
UNCED = United Nations Commission on the Environment and Development
UNCTAD = United Nations Centre for Trade and Development
UNEP = United Nations Environmental Programme
UNIDO = United Nations Industrial Development Organisation
USAID = United States Agency for Aid and International Development
WCED = World Commission for Environment and Development
WEC = World Environmental Council

Acknowledgements

Thanks to Dr. Anthony J. Wiener for his suggestions and criticisms; Nuffield and DFID for grants; officers of UNIDO/UNEP for information; Kelvin Harewood for research assistance; CERES (Nairobi) and SPRU (Sussex University) for inviting me as a visiting research fellow.

References

[1] United Nations Conference on Environment and Development, Agenda 21, Chapter 34. Rio De Janeiro, 1992, 212-213.
[2] United Nations Conference on Environment and Development, Agenda 21, Chapter 34. Rio De Janeiro, 1992, 212.
[3] United Nations Conference on Environment and Development. Agenda 21. New York and Paris, 1992, 212.
[4] United Nations Conference on Environment and Development. Agenda 21. New York and Paris, 1992, 212.
[5] United Nations Conference on Environment and Development. Agenda 21. New York and Paris, 1992, 212.
[6] UNCTAD & the Government of Norway. Report on the Workshop on the Transfer and Development of Environmentally Sound

Technologies. New York and Geneva, 13-15 October 1999, 3-4.
[7] Carson R. *The Silent Spring*. Boston: Beacon Press, 1963, 31.
[8] Puntener A. "Ecology and Modern Leather Production." *Leather*, September 1997, 37.
[9] United Nations Environmental Program, Cleaner Production in Leather Tanning: A Workbook for Tanners. Paris, March 1996; 8: 15.
[10] United Nations Environmental Program, Cleaner Production in Leather Tanning: A Workbook for Tanners. Paris, March 1996; 8: 15.
[11] Kisch P, Ryden E, Lindhqvist T. Evaluation of the UNIDO/UNEP National Cleaner Production Centre Programme, Final Report: Vietnam, UNIDO, 6 August 1996.
[12] Cleaner Production Centre of Zimbabwe (CPCZ) Newsletter. April, 1997.
[13] Grutter JM. Comparative Analysis of Cleaner Production Centres. Unpublished memo, July 2, 1998.
[14] ibid.
[15] ibid.
[16] ibid.
[17] ibid.
[18] Chandak, S. P. (1995) *Demonstrating Cleaner production in SME's in India: The Experience of Project 'Desire' National Production Council* New Delhi, India.

DEVELOPMENT RESEARCH SERIES

WORKING PAPERS:

No. 1: *Olav Jull Sørensen*: Marketing Issues in Peasant Agricultural Development, 55pp, 1983.

No. 2: *Hans Gullestrup*: The Ecol-Humanistic Technology - the new Technology as Experiences from the Past, 33pp, 1983.

No. 3: *Georg Sørensen*: Transnationals and the Transfer of Technology to the Third World, 31pp, 1984.

No. 4: *Georg Sørensen*: International Bureaucracies and Aid: The Political Economy of the 'B-Share', 11pp, 1984.

No. 5: *Georg Sørensen*: Notes on Materialism and Boredom - Western Development Ideals, 12pp, 1984.

No. 6: *Olav Jull Sørensen*: Marketing Systems and Economic Development. An Institutional-Structural Approach, 41pp, 1984.

No. 7: *Georg Sørensen*: How much Poison is Another Man's Meat? - Notes on the Logic of World Systems Analysis, 29pp, 1984.

No. 8: *Georg Sørensen*: Peace and Development: Looking for the Right Track, 18pp, 1984.

No. 9: *Georg Sørensen*: The Twists and Turns of Development Theory - A Comment on "The European Experience" by Dieter Senghaas. 19pp, 1984.

No. 10: *Jacques Hersh & Ellen Brun*: Aspects of Soviet Participation in a Shifting World Economy. 45pp, 1984.

No. 11: *Olav Jull Sørensen*: Marketing System Development and Labour Migration: Analysis and Consequences. 41pp, 1984.

No. 12: *Georg Sørensen*: How Cold is the Second Cold War? - An Assessment of the Scope of 'the Great Contest'. 23pp, 1984.

No. 13: *John E. Kuada*: Agricultural Development in the Third World. 23pp, 1984.

No. 14: *Olav Jull Sørensen*: Profiles of Tanzanian Peasants and their Marketing Implications. 52pp, 1984.

No. 15: *Jørgen Kristiansen*: Urban Passenger Transport in Developing Countries - Socio-economic Impact and the Choice of Technology. 58pp, 1985.

No. 16: *John E. Kuada*: Marketing Systems in a Development Process. 35pp, 1985.

No. 17: *Georg Sørensen*: Some Contradictions in a Rich Concept on Development. 14pp, 1985.

No. 18: *Olav Jull Sørensen*: Marketing of Agricultural Inputs/Implements and Profiles of Farmers in Kenya: Project Preparations. 47pp, 1986.

No. 19: *Georg Sørensen*: Development Through the Eyes of a Child. 17pp, 1986.

No. 20: *Georg Sørensen*: International and External Intertwined: 5 Obstacles to Development in India. 20pp, 1986.

No. 21: *John E. Kuada*: Macro-Micro Integrated Framework for Market Opportunity Analysis and Project Selection. 14pp, 1986.

No. 22: *Olav Jull Sørensen*: Co-operatives: Movement-to-Movement Cooperation. Some Conceptual Views. 15pp, 1986.

No. 23: *John E. Kuada*: Financing Rural Food Marketing Systems in Ghana. 16pp, 1986.

No. 24: *Hans Gullestrup*: Culture, Cultural Analysis and Cultural Ethics - Or What Divides and What Unites Us? (Out of print) (in Danish). 84pp, 1987.

No. 24a: *Hans Gullestrup*: Culture, Cultural Analysis and Cultural Ethics - Or What Divides and What Unites Us? (Second revised edition) (Out of print) (in Danish). 92pp, 1988.

No. 25: *John E. Kuada*: Food Marketing in Ghana, the Role of Rural Food Traders. 53pp, 1988.

No. 26: *Henrik A. Nielsen*: Monitoring Rural Development in Bangladesh. 22pp, 1989.

No. 27: *Hans Gullestrup*: The Ethical Dilemma in *the* Intercultural Co-operation, or: The Development Aid Worker's Personal Problem (in Danish). 26 pp, 1991.

No. 28: *Chaiwoot Chaipan*: Current Issues on Economic Development in East and Southeast Asia. 24pp, 1991.

No. 29: *Henrik Nielsen:* Databased Information on Danida-Projects 1962-91: Overview and Analysis of the Daniproj-Database. 55pp, 1992.

No. 30: *Hans Gullestrup*: Evaluating Social Consequences of Social Changes in the Third World Countries. 24pp, 1993.

No. 31: *Johannes Dragsbaek Schmidt*: In The Shadow of the Pacific Century - Comparative Perspectives on Externalities Influence on Economic Policy-Making in Southeast Asian Would-be NICs. 106pp, 1993.

No. 32: *Henrik A. Nielsen:* Local Community Development Around the Bay of Bengal: Context, Crises and Perspectives. 27pp, 1994.

No. 33: *Johannes Dragsbaek Schmidt:* Southeast Asian State Responses to a Regionalized World Economy. 21pp, 1994.

No. 34: *Johannes Dragsbaek Schmidt:* Semi-autonomy in Economic Policy-making: The Case of Thailand. 28pp, 1994.

No. 35: *Johannes Dragsbaek Schmidt:* Increasing Exports in a Decreasing World Market: The Role of Developmental States in the ASEAN-4. 27pp, 1994.

No. 36: *Johannes Dragsbaek Schmidt:* State Capacities and Bargaining Strategies in the Global Disorder. 14pp, 1994.

No. 37: *Samir Amin:* The Future of Global Polarization. 17pp, 1994.

No. 38: *Peter W. Cunningham:* The Re-affirmation of State Socialism. The South African Debate. 17pp, 1995.

No. 39: *Andre Gunder Frank:* Nothing New in the East: No New World Order. 28pp, 1994.

No. 40: *Johannes Dragsbaek Schmidt:* State Intervention in Southeast Asia. Creating Growth without Welfare. 20pp, 1994.

No. 41: *Garry Rodan:* Ideological Convergences Across 'East' and 'West': The New Conservative Offensive. 24pp, 1995.

No. 42: *Jacques Hersh:* North Korea: Ideal-Type Anomaly. 18pp, 1995.

No. 43: *Research Centre for Development and International Relations (DIR), Johannes Dragsbaek Schmidt et al. (eds.)*: Research Program 1995-1997. Globalization and Social Change - Structures, Systems and Unidisciplinary Research. 74pp, 1995.

No. 44: *Feiwel Kupferberg:* Ethno-nationalism, Liberal Democracy and the Psychology of the Post Cold War Era. 19pp, 1995.

No. 45: *Feiwel Kupferberg:* Uncertainty, Chaos and Learning: Prolegomenon to a Sociology of Creativity. 27pp, 1995.

No. 46: *Feiwel Kupferberg:* Strategic Learning: East Germany as a "Model Case" for Transformation Theory. 26pp, 1995.

No. 47: *Li Xing*: China and East Asia vs. The West: Controversies, Clashes and Challenges. 19pp, 1995.

No. 48: *Kwang-Yeong Shin:* Democratization and Class Politics in Korea, 1987 - 1993. 20pp, 1995.

No. 49: *Joachim Hirsch:* Regulation Theory and its Applicability to Studies on Globalization and Social Change. 12pp, 1995.

No. 50: *Ellen Brun:* The New Social Contract: Sustainability from below. 20pp, 1995.

No. 51: *Li Xing:* The Dynamics of East Asian Intra-Regional Economic Relations. 22pp, 1995.

No. 52: *Kwang-Yeong Shin:* Characteristics of the East Asian Economic System: Authoritarian Capitalism and the Developmental State. 33pp, 1996.

No. 53: *Li Xing:* Playing Democracy and Human Rights. The International System and the China-West Case. 17pp, 1996.

No. 54: *Jacques Hersh & Johannes Dragsbaek Schmidt:* Dirigisme or Laissez-Faire? - Catching-up Strategies in the Global System After the Demise of Soviet-Style Command Economies. 22pp, 1996.

No. 55: *Johannes Dragsbaek Schmidt & Jacques Hersh:* Peace Convergence and Political Legitimacy in Israel and Palestine. 16pp, 1997.

No. 56: *David Harvey:* Globalization in Question. 22pp, 1997.

No. 57: *Amiya Kumar Bagchi:* In Praise of the Developmental State. 35pp, 1997.

No. 58: *Su-Hoon Lee:* The Rise of Environmentalism in South Korea. 31pp, 1997.

No. 59: *Mark Beeson & Kanishka Jayasuriya:* The Politics of Regionalism: APEC and the EU in Comparative Perspective. 37pp, 1997.

No. 60: *Manfred Bienefeld:* The State and Civil Society: The Political Economy of the "New Social Policy". 35pp, 1997.

No. 61: *Duncan McCargo:* Problematising Democratisation: The Thai Case. 22pp, 1997.

No. 62: *Li Xing:* Conceptualizing the Crisis of Socialism: A Gramscian Approach. Some Reflections on the Chinese Socialist Experience. 41 pp, 1998.

No. 63: *Henrik A. Nielsen*: Decentralising the Monitoring of Development Intervention: From Local Government Impact-Monitoring. 116pp, 1998.

No. 64: *Suresh Narayanan*: From Miracle to Realities: The Malaysian Economy in Crisis. 26 pp, 1998.

No. 65: *Li Xing, Jacques Hersh & Johannes Dragsbaek Schmidt*: The Rise and Fall of East Asian Capitalism: Back to the future? 30 pp, 1998.

No. 66: *Jan Oberg*: Globalization and Responses by Civil Society to Humanitarian Emergencies. 44 pp, 1998.

No. 67: *Johannes Dragsbaek Schmidt*: Development Theory and the Crisis of the State. 30 pp, 1998.

No. 68: *Johannes Dragsbaek Schmidt, Jacques Hersh and Li Xing (eds.) and members of DIR*: Research Program 1998-2000 Globalization and Social Change Interdisciplinary Critical Perspectives. 81 pp, 1998.

No. 69: *Katarina Tomaševski:* Human Rights in International Development Co-operation: Between Politics and Policy. 69 pp, 1999.

No. 70: *Mammo Muchie:* Problems of Sub-Saharan Africa's Renewal in the Era of Globalisation. 32 pp, 1999.

No. 71: *Wolfgang Sachs:* Globalization and Sustainability. 38 pp, 1999.

No. 72: *Xing Li:* The Market Approach to Industrialization: A Critique of China´s Experiment. 37 pp, 1999.

No. 73: *Bob Jessop*: The State and the Contradictions of the Knowledge-Driven Economy. 37 pp, 1999.

No. 74: *Bob Jessop*: What follows Fordism? On the Periodization of Capitalism and its Regulation. 36 pp, 1999.

No. 75: *Mammo Muchie*: Climbing the Value-Added Chain in Leather Manufacture: Lessons from the Indian Case to Enhance Value-Added Leather Processing in Ethiopia and Kenya. 26pp, 2000.

No. 76: *Stanislav Menshikov*: Macropolicies to Help Re-Start Economic Growth in Russia. 44 pp, 2000.

No. 77: *Stanislav Menshikov*: Indicators and Trends of Economic Globalisation. 26 pp, 2000.

No. 78: *Stanislav Menshikov*: The Role of International Capital Flows: How to Reduce the Vulnerability of the Global Economy. 23 pp, 2000.

No. 79: *Mammo Muchie*: The Way Africa Entered The Millennium: Trousers and Skirts Down or Head High: A Commentary. 19 pp, 2000.

No. 80: *Manfred Bienefeld*: Globalisation and Social Change: Drowning in the Icy Waters of Commercial Calculation. 48 pp, 2000.

No. 81: *Mammo Muchie*: From Protest to Sanitation: Critical Reflections on the UN´s Discourse of Environmentally friendly Technologies. 24 pp, 2000.